



Assignment Sheet / Density Test

Project Number : 23502-ZS9 Lab. Tech : K. Ford
Project Name : HSR Date Completed : 10/25/13
Date Drilled : 10/3/13 Boring : S0069R

Notes:

CHEM	Sulfate/Chloride	MR	Minimum Resistivity
COLL	Collapse	PH	pH Test
CONSOL	1D Consolidation	PI	Atterberg Limits
CURV	Modified Proctor	RV	R-value
DD	Moisture Density	SA	Sieve Analysis
DS	Direct Shear	TRX	Triaxial Compression
HY	Hydrometer		

<u>MOISTURE & DENSITY TEST</u>								
Client : URS/ARUP/HMM JV			Project : California High Speed Train				ISI Lab No.: G-52923	
Boring #	S0029R	S0029R	S0030R	S0033AR	S0069AR	S0069AR	S0069AR	S0069R
Sample #	MC09-2	U10	MC10-3	SS16	U11	MC16-1	MC18-1	MC02-2
Depth (ft.)	41.0-41.5	42.0-44.5	42.0-42.5	50.0-51.5	42.0-44.5	65.0-66.5	75.0-76.5	5.5-6.0
Soil type: (visual)	Grayish brown silty clay	Olive brown sandy silt	Greenish gray clayey sand	Grayish brown silt with sand (BAGGIE COULD NOT DO MD)	Olive brown sandy clay	Olive gray sandy clay	Olive brown silty clay	Grayish green clay with sand
1. Date tested:	01/17/14	01/17/14	01/17/14	01/15/14	01/17/14	01/17/14	01/17/14	01/17/14
2. Tested by:	JH	JH	JH	JH	JH	JH	JH	JH
3. Specimen height (in.)	5.96	3.93	5.90		3.96	6.00	6.00	5.95
4. Wt. of specimen + tare (gm)	900.72	868.95	815.58		880.48	951.22	956.29	897.34
5. Tare wt. (gm)	0.00	0.00	0.00		0.00	0.00	0.00	0.00
6. Diameter (in.)	2.41	2.85	2.37		2.87	2.42	2.42	2.41
7. Wet wt. of soil + dish wt. (gm)	276.47	264.91	298.04	98.44	273.64	275.82	301.24	293.74
8. Dry wt. of soil + dish wt. (gm)	229.46	229.54	247.22	90.20	239.02	239.79	257.94	255.15
9. Wt. of dish (gm)	50.59	50.41	50.06	50.96	51.20	50.87	50.41	50.89
10. Dish ID								
Wet Density (pcf)	126.1	131.9	119.3		130.8	131.2	131.9	125.8
Dry Density (pcf)	99.9	110.2	94.8		110.5	110.2	109.1	105.8
Moisture Content (%)	26.3	19.7	25.8	21.0	18.4	19.1	20.9	18.9
Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.687	0.529	0.777		0.525	0.529	0.544	0.592
Saturation (%)	103.3	100.7	89.6		94.8	97.3	103.6	86.2
Additional data:								
Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								



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Sieve Analysis for Soil and Fine Aggregate

Project:	CA HSR FRE_BAK	Technician:	K. Ford
		Date:	10/16/2013
TES#:	23502-ZS9	Sample No.:	B01
Boring No.:	S0069R	Remarks:	(SM) Silty Sand

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	74.1	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	74.1	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	49.6	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.9	1.2	1.2	98.8	
#10	0.4	0.5	1.8	98.2	
#16	0.2	0.3	2.0	92.0	
#30	11.9	16.1	18.1	82.2	
#40	5.2	7.0	25.1	75.3	
#50	6.9	9.3	34.4	66.1	
#100	13.3	18.0	52.4	48.5	
#200	11.3	15.3	67.6	33.5	
Pan					

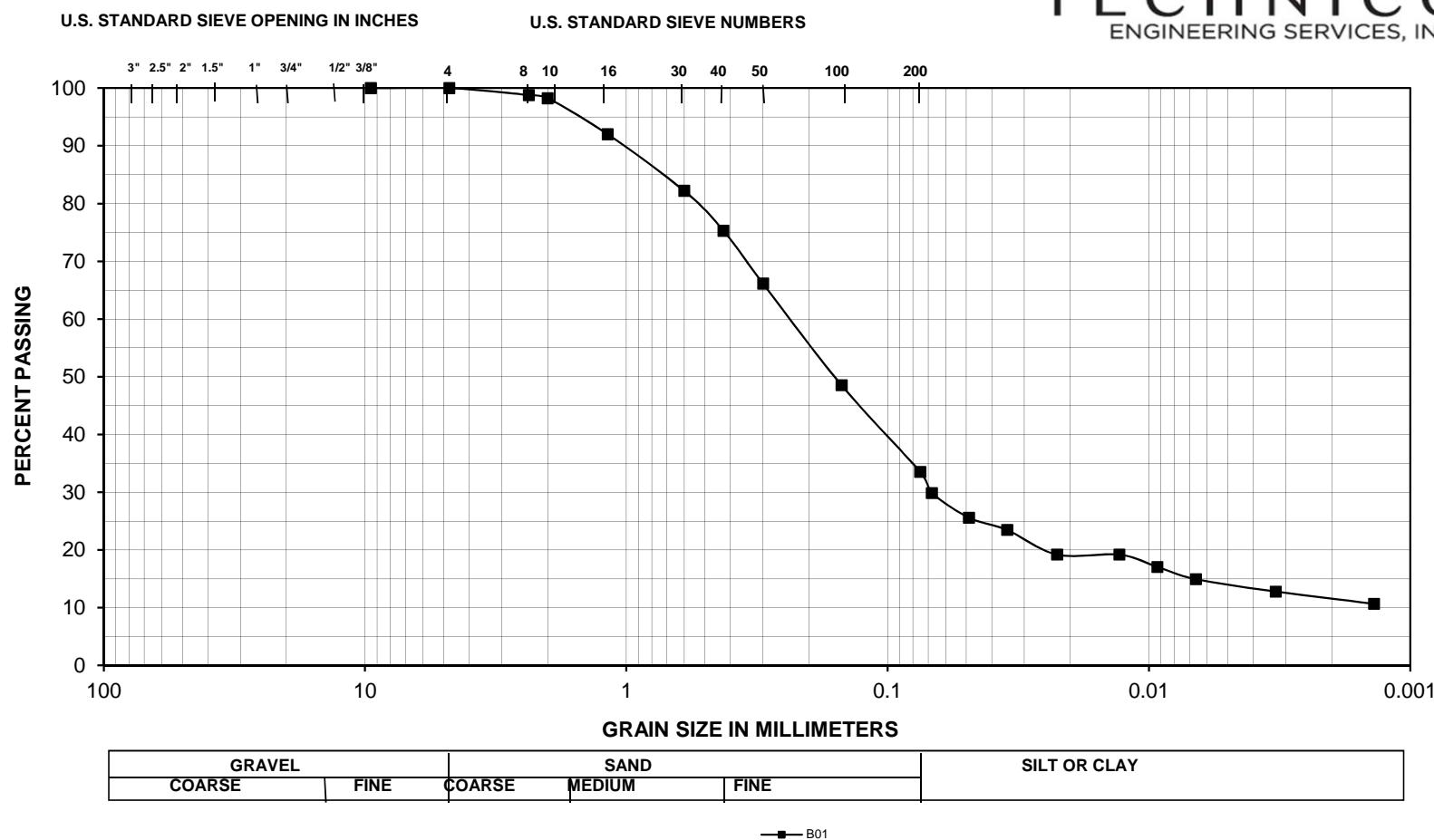


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HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:	CA HSR FRE_BAK			TES # :	23502-ZS9			
Boring Number	S0069R			DATE:	10/16/2013			
Sample Depth, ft	0.0-5.0'			Sample No.:	B01			
			TESTED BY: K. Ford					
Mass of Test Sample, g	75.00		"air-dried"	Hydrometer Type 151H				
Mass of Hygroscopic Sample, g	12.02		"air-dried"					
Mass of Hygroscopic Sample, g	11.87		"oven-dried"	Specific Gravity of Test Material		2.650		
Mass of Test Sample, g	74.06		"oven-dried"	Specific Gravity of Test Solution		Varies		
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)	
0.5	1.016	1.014	21	12.6	0.01348	0.0677	30.4	
1	1.014	1.012	21	13.1	0.01348	0.0488	26.1	
2	1.013	1.011	21	13.4	0.01348	0.0349	23.9	
5	1.011	1.009	21	13.9	0.01348	0.0225	19.5	
15	1.011	1.009	21	13.9	0.01348	0.0130	19.5	
30	1.010	1.008	21	14.2	0.01348	0.0093	17.4	
60	1.009	1.007	21	14.4	0.01348	0.0066	15.2	
250	1.008	1.006	21	14.7	0.01348	0.0033	13.0	
1440	1.007	1.005	21	15.0	0.01348	0.0014	10.9	
4140	1.006	1.004	21	15.2	0.01348	0.0008	8.7	



Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
B01	(SM) Silty Sand	0	67.6	20.6	11.8	1.3				TES#:	23502-ZS9
										Boring#:	S0069R
										Date:	10/16/2013

* Particles smaller than 5 Micron in diameter



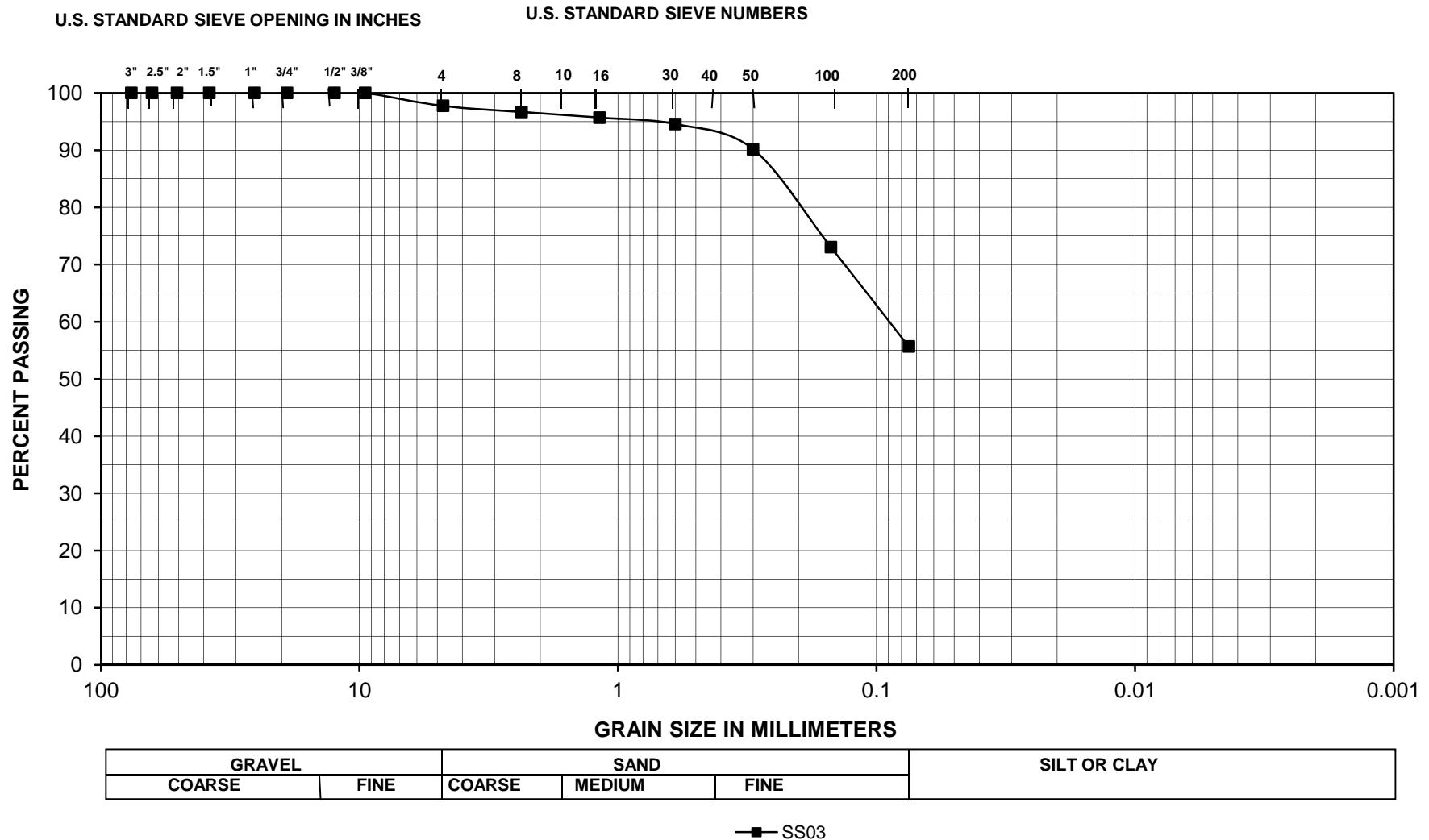
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Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	10/3/2013
TES#:	23502-ZS9	Sample No.:	SS03
Boring #:	S0069R; 11.0-11.5'	Classification:	(ML) Sandy Silt

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	234.8	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	234.8	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	109.4	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	5.3	0.0	2.3	97.7	
#8	7.8	2.5	3.3	96.7	
#16	10.1	2.3	4.3	95.7	
#30	12.8	2.7	5.5	94.5	
#50	23.1	10.3	9.8	90.2	
#100	63.3	40.2	27.0	73.0	
#200	104.1	40.8	44.3	55.7	
Pan	109.4				





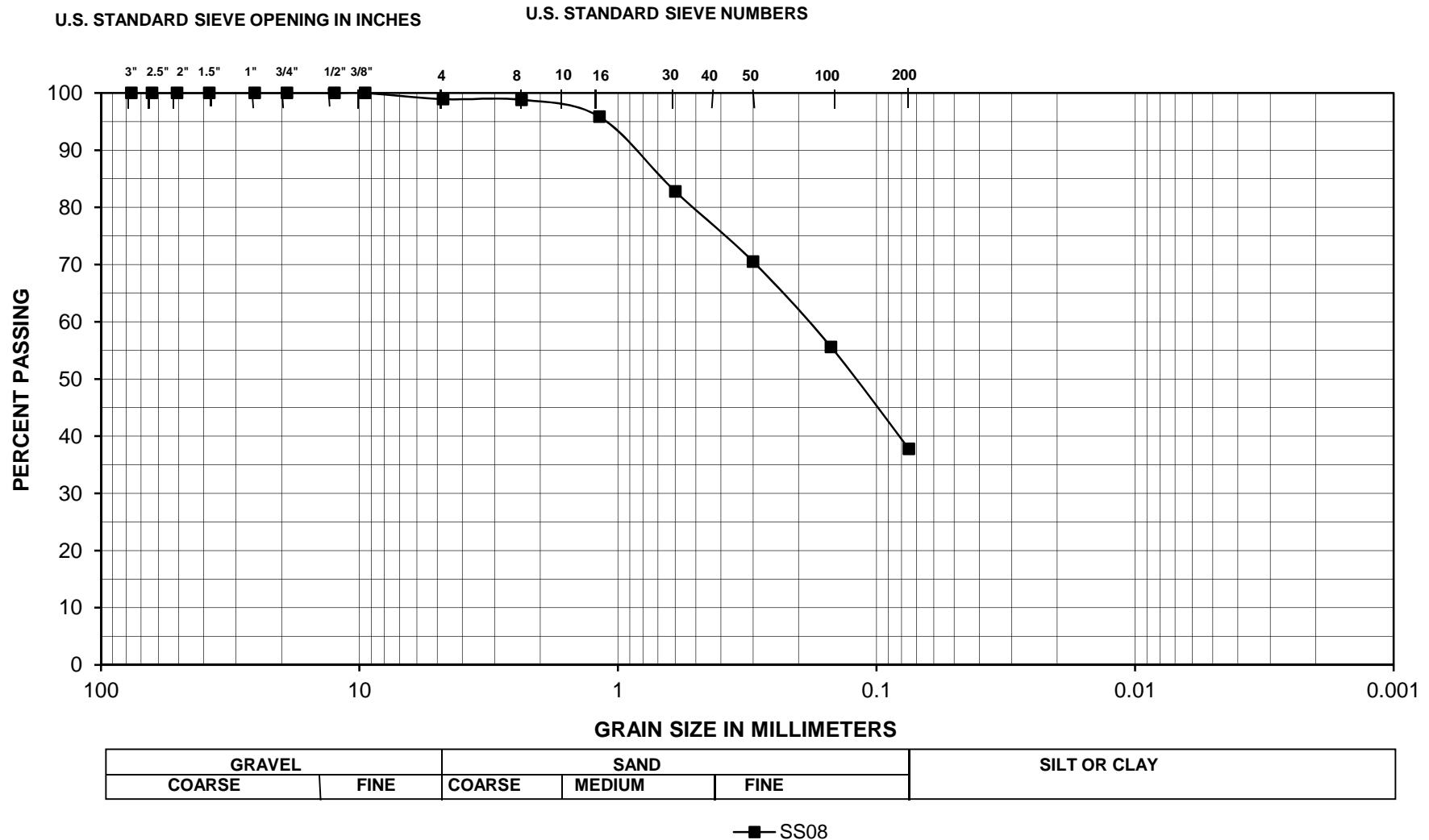
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Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	10/3/2013
TES#:	23502-ZS9	Sample No.:	SS08
Boring #:	S0069R; 36.0-36.5'	Classification:	SM Silty Sand

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	250.9	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	250.9	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	162.5	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	2.7	0.0	1.1	98.9	
#8	3.0	0.3	1.2	98.8	
#16	10.4	7.4	4.1	95.9	
#30	43.2	32.8	17.2	82.8	
#50	74.0	30.8	29.5	70.5	
#100	111.4	37.4	44.4	55.6	
#200	156.1	44.7	62.2	37.8	
Pan	162.5				





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Sieve Analysis for Soil and Fine Aggregate

Project:	CA HSR FRE_BAK	Technician:	K. Ford
		Date:	10/16/2013
TES#:	23502-ZS9	Sample No.:	SS14
Boring No.:	S0069R	Remarks:	(SM) Silty Sand

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	98.2	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	98.2	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	56.8	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.2	0.2	0.2	99.8	
#10	0.2	0.2	0.4	99.6	
#16	0.2	0.2	0.6	98.0	
#30	9.2	9.4	10.0	90.1	
#40	7.4	7.5	17.5	82.6	
#50	10.8	11.0	28.5	71.6	
#100	17.4	17.7	46.2	54.0	
#200	11.1	11.3	57.5	42.7	
Pan					

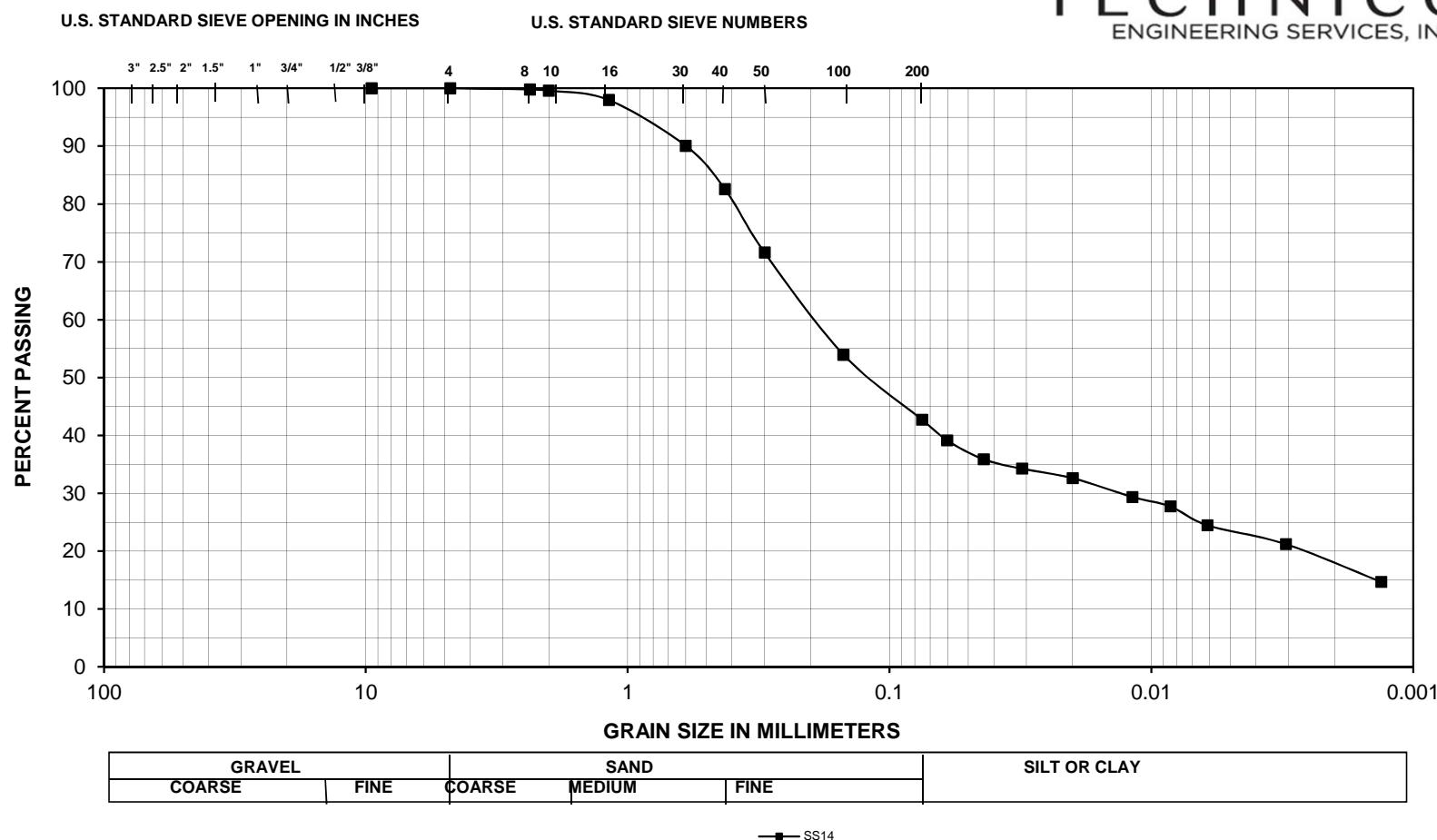


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HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:	CA HSR FRE_BAK			TES # :	23502-ZS9			
Boring Number	S0069R			DATE:	10/16/2013			
Sample Depth, ft	66.0'-66.5'			Sample No.:	SS14			
			TESTED BY: K. Ford					
Mass of Test Sample, g	100.00		"air-dried"	Hydrometer Type 151H				
Mass of Hygroscopic Sample, g	15.01		"air-dried"					
Mass of Hygroscopic Sample, g	14.74		"oven-dried"	Specific Gravity of Test Material		2.650		
Mass of Test Sample, g	98.20		"oven-dried"	Specific Gravity of Test Solution		Varies		
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)	
0.5	1.026	1.024	21	10.0	0.01348	0.0603	39.3	
1	1.024	1.022	21	10.5	0.01348	0.0437	36.0	
2	1.023	1.021	21	10.7	0.01348	0.0312	34.4	
5	1.022	1.020	21	11.0	0.01348	0.0200	32.7	
15	1.020	1.018	21	11.5	0.01348	0.0118	29.5	
30	1.019	1.017	21	11.8	0.01348	0.0085	27.8	
60	1.017	1.015	21	12.3	0.01348	0.0061	24.6	
250	1.015	1.013	21	12.9	0.01348	0.0031	21.3	
1440	1.011	1.009	21	13.9	0.01348	0.0013	14.7	
4140	1.010	1.008	21	14.2	0.01348	0.0008	13.1	



Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
SS14	(SM) Silty Sand	0	57.5	30.7	11.8	1.8				TES#:	23502-ZS9
										Boring#:	S0069R
										Date:	10/16/2013

* Particles smaller than 5 Micron in diameter



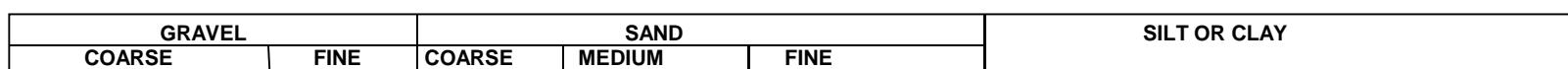
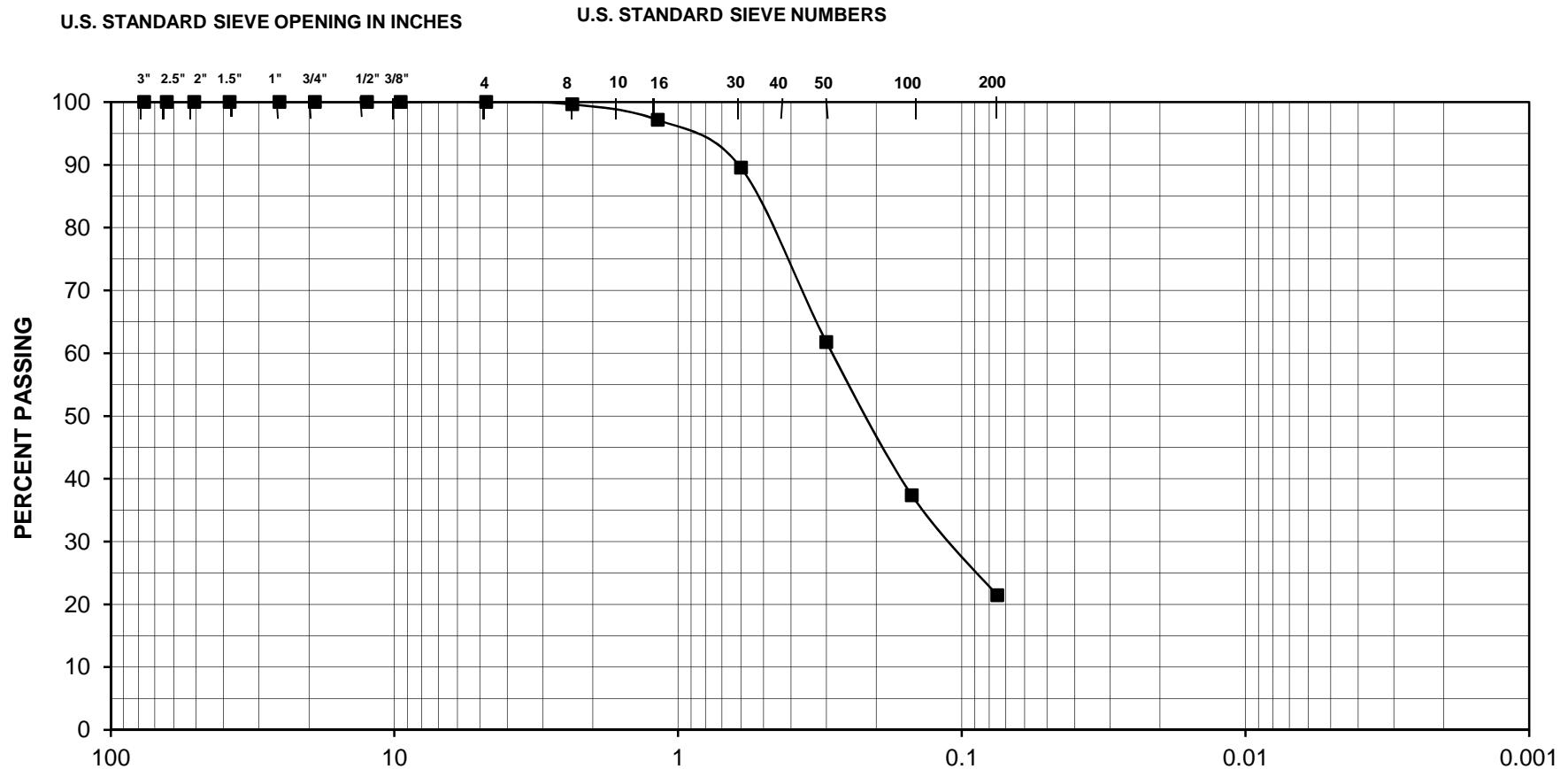
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Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	10/3/2013
TES#:	23502-ZS9	Sample No.:	MC15-2
Boring #:	S0069R; 70.5-71.0'	Classification:	(SM) Silty Sand

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	334.4	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	334.4	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	271.4	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	1.2	1.2	0.4	99.6	
#16	9.5	8.3	2.8	97.2	
#30	35.0	25.5	10.5	89.5	
#50	127.8	92.8	38.2	61.8	
#100	209.4	81.6	62.6	37.4	
#200	262.7	53.3	78.6	21.4	
Pan	271.4				



— MC15-2



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Sieve Analysis for Soil and Fine Aggregate

Project:	CA HSR FRE_BAK	Technician:	K. Ford
		Date:	10/16/2013
TES#:	23502-ZS9	Sample No.:	SS18
Boring No.:	S0069R	Remarks:	(SM/ML) Sandy Silt

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	74.0	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	74.0	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	38.3	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.1	0.1	0.1	99.9	
#10	0.1	0.1	0.3	99.7	
#16	0.2	0.3	0.5	97.8	
#30	5.2	7.0	7.6	92.4	
#40	3.9	5.3	12.8	87.2	
#50	6.8	9.2	22.0	78.0	
#100	9.5	12.8	34.9	65.2	
#200	10.0	13.5	48.4	51.7	
Pan					

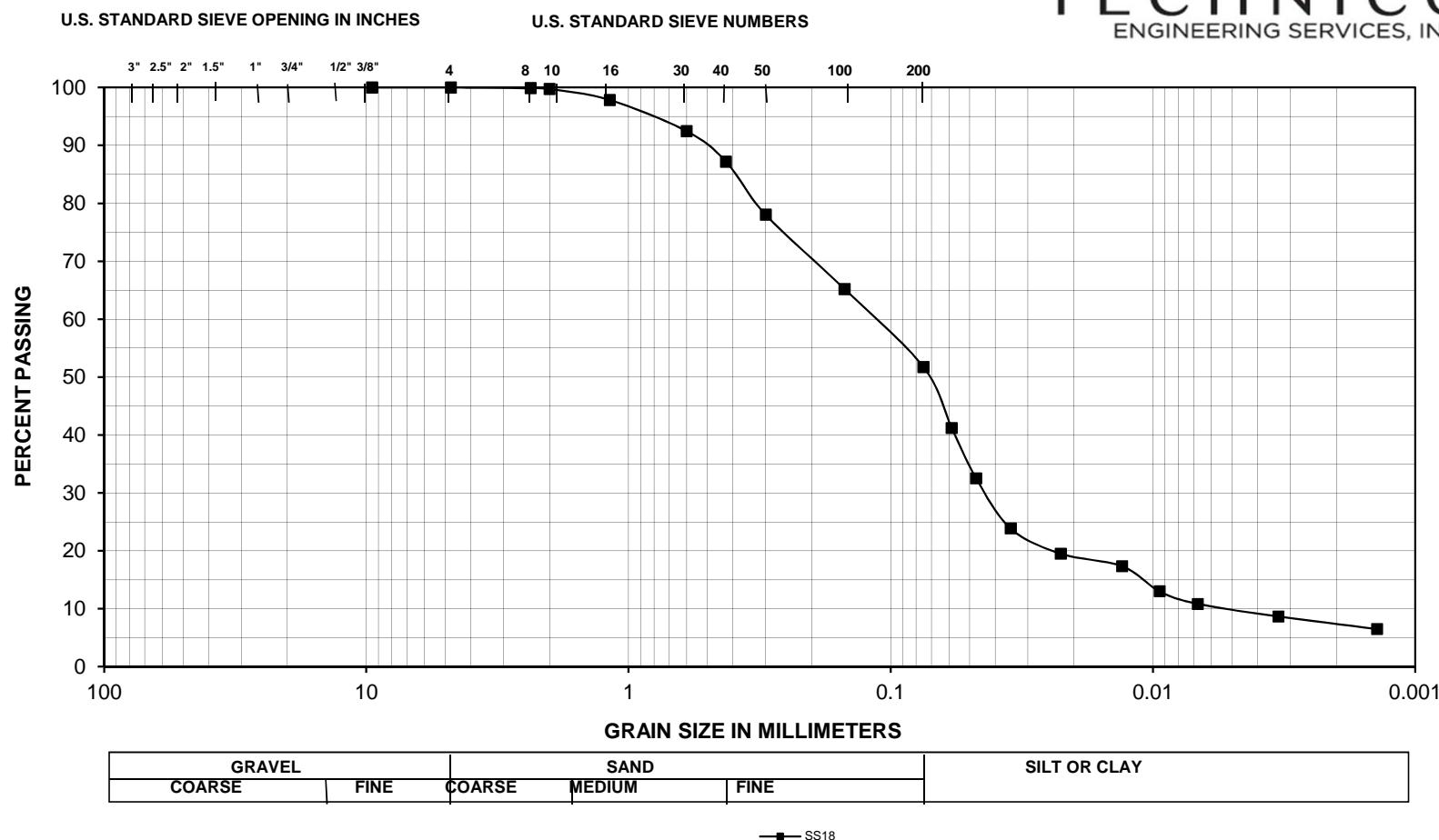


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HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:	CA HSR FRE_BAK			TES # :	23502-ZS9			
Boring Number	S0069R			DATE:	10/16/2013			
Sample Depth, ft	86.0'-86.5'			Sample No.:	SS18			
			TESTED BY: K. Ford					
Mass of Test Sample, g	75.00		"air-dried"	Hydrometer Type 151H				
Mass of Hygroscopic Sample, g	8.67		"air-dried"					
Mass of Hygroscopic Sample, g	8.55		"oven-dried"	Specific Gravity of Test Material		2.650		
Mass of Test Sample, g	73.96		"oven-dried"	Specific Gravity of Test Solution		Varies		
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)	
0.6	1.021	1.019	21	11.3	0.01348	0.0585	41.3	
1	1.017	1.015	21	12.3	0.01348	0.0473	32.6	
2	1.013	1.011	21	13.4	0.01348	0.0349	23.9	
5	1.011	1.009	21	13.9	0.01348	0.0225	19.6	
15	1.010	1.008	21	14.2	0.01348	0.0131	17.4	
30	1.008	1.006	21	14.7	0.01348	0.0094	13.0	
60	1.007	1.005	21	15.0	0.01348	0.0067	10.9	
250	1.006	1.004	21	15.2	0.01348	0.0033	8.7	
1440	1.005	1.003	21	15.5	0.01348	0.0014	6.5	
4140	1.005	1.003	21	15.5	0.01348	0.0008	6.5	



Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
SS18	(SM/ML) Sandy Silt	0	48.4	39.8	11.8	1.4				TES#:	23502-ZS9
										Boring#:	S0069R
										Date:	10/16/2013

* Particles smaller than 5 Micron in diameter



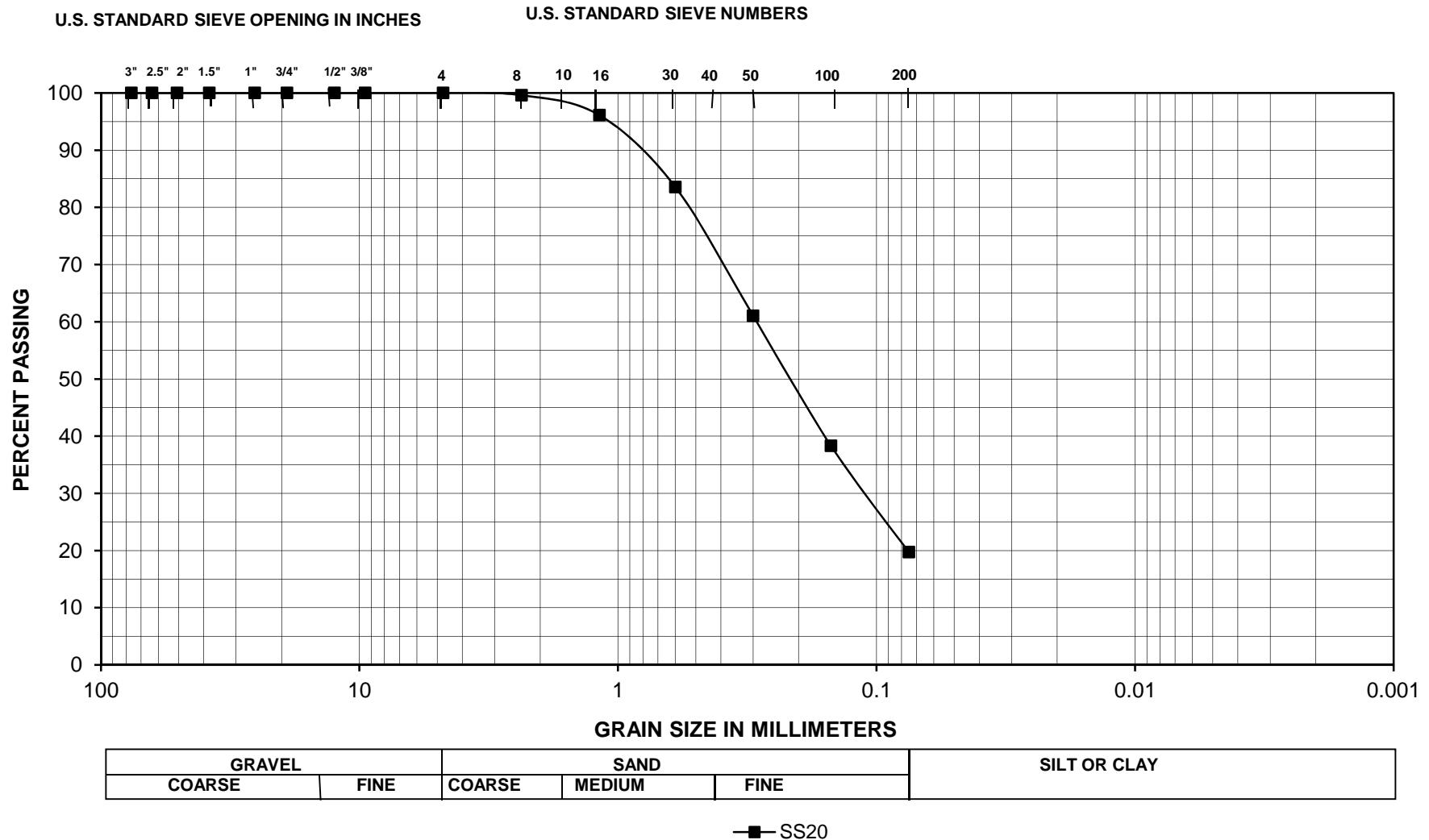
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Sieve Analysis for Soil / Fine Aggregate ASTM C-136

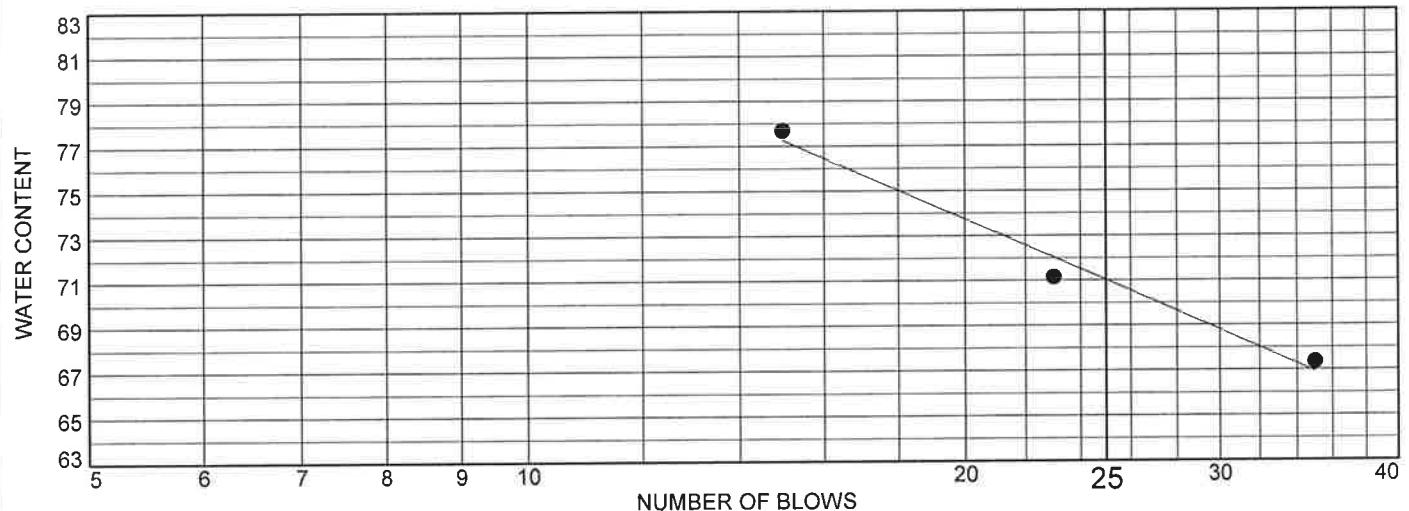
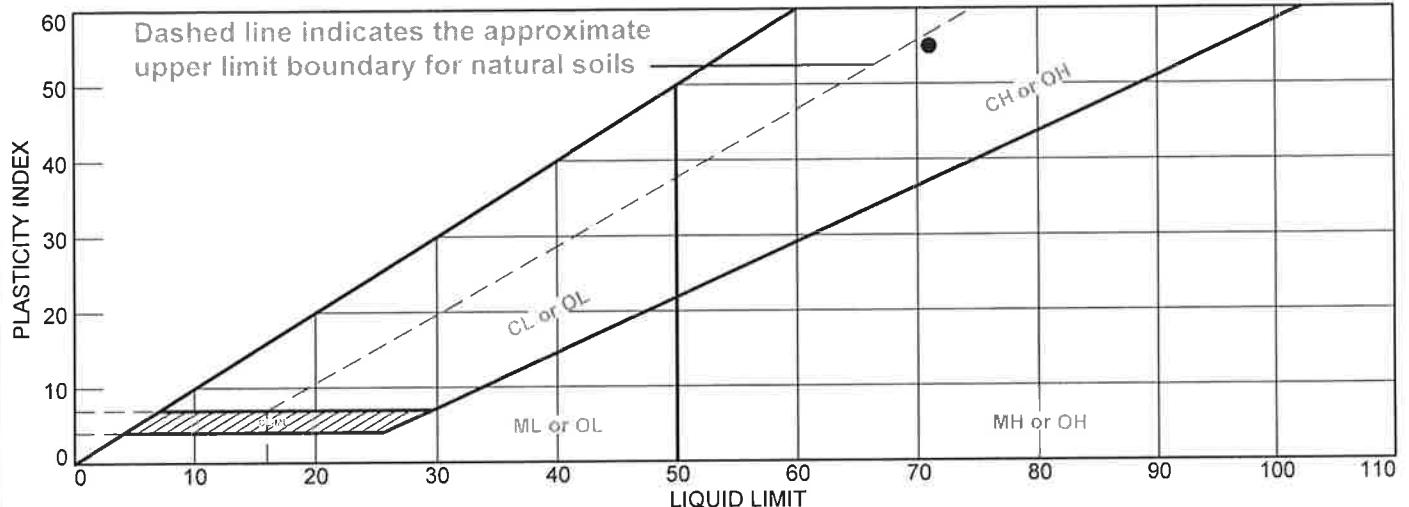
Project:	CA HSR	Technician:	K. Ford
		Date:	10/3/2013
TES#:	23502-ZS9	Sample No.:	SS20
Boring #:	S0069R; 96.0-96.5'	Classification:	(SM) Silty Sand

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	255.1	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	255.1	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	209.6	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	1.0	1.0	0.4	99.6	
#16	9.9	8.9	3.9	96.1	
#30	41.9	32.0	16.4	83.6	
#50	99.4	57.5	39.0	61.0	
#100	157.4	58.0	61.7	38.3	
#200	204.8	47.4	80.3	19.7	
Pan	209.6				



LIQUID AND PLASTIC LIMITS TEST REPORT



Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

Remarks:

● Source: S0069R G-52923

Depth: 5.5-6.0

Sample No.: MC02-2



Figure

Tested By: JH

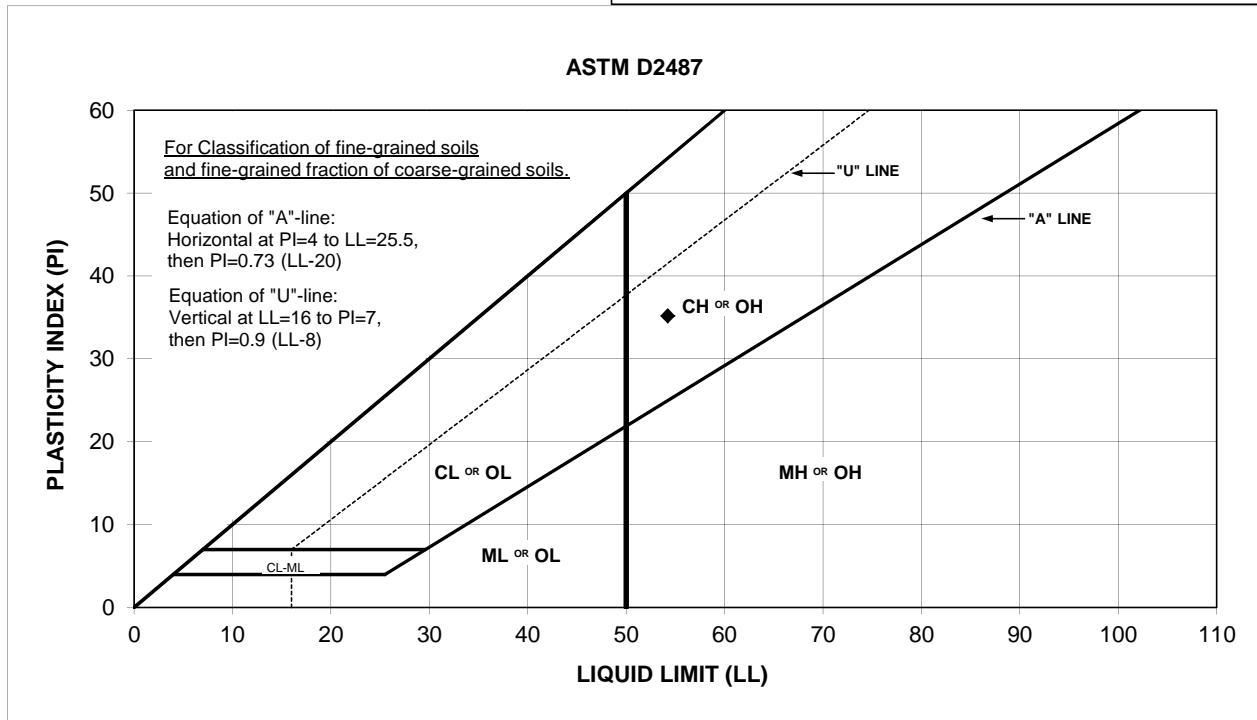
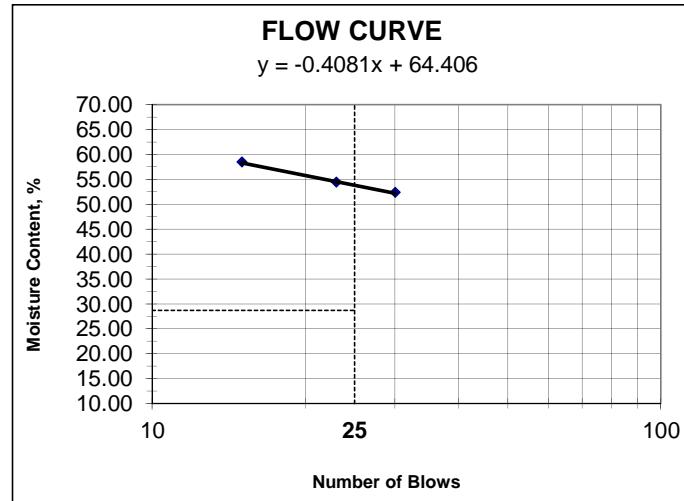
Checked By: PH

Determination of Atterberg Limits
ASTM D 4318, CTM 204

Project Name:	HSR	Project No.:	23502-ZS9	
Soil Boring No:	S0069R	Depth:	6.5'-7.0'	
Sample No.:	U03	Date: 10/14/13 Tested By: S. Alvarez		
Classification: (CH) Fat clay				

	PLASTIC LIMIT			LIQUID LIMIT			
A	1	2	3	No. of Blows	30	23	15
Tes No.							
Tare No.							
C Mass of Pan + Dry Soil, g	23.94	30.30	30.74		26.71	34.83	35.79
D Mass of Pan + Wet Soil, g	24.55	30.67	31.23		29.71	38.23	40.18
E Mass of Pan, g	20.53	28.34	28.32		20.99	28.59	28.29
F Mass of Water, g	0.61	0.37	0.49		3.00	3.40	4.39
G Mass of Dry Soil, g	3.41	1.96	2.42		5.72	6.24	7.50
H Moisture Content, %	17.89	18.88	20.25		52.45	54.49	58.53
I Average Moisture Content, % (PL)		19.00					

Liquid Limit:	54.2
Plastic Limit: Line I	19.0
Plasticity Index: PI = LL - PL	35.2

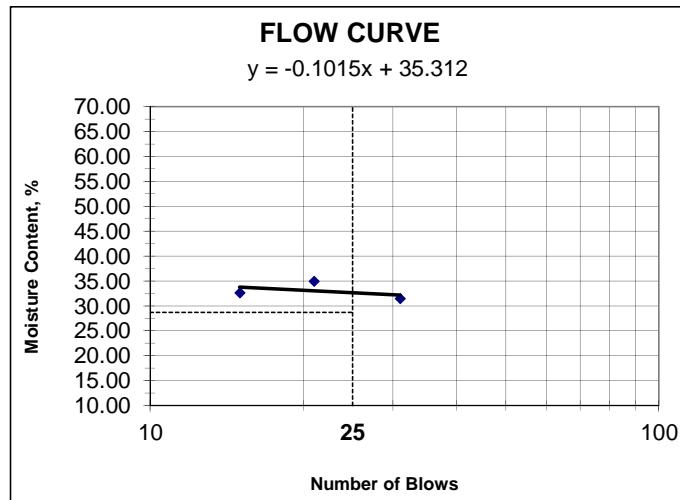


Determination of Atterberg Limits
ASTM D 4318, CTM 204

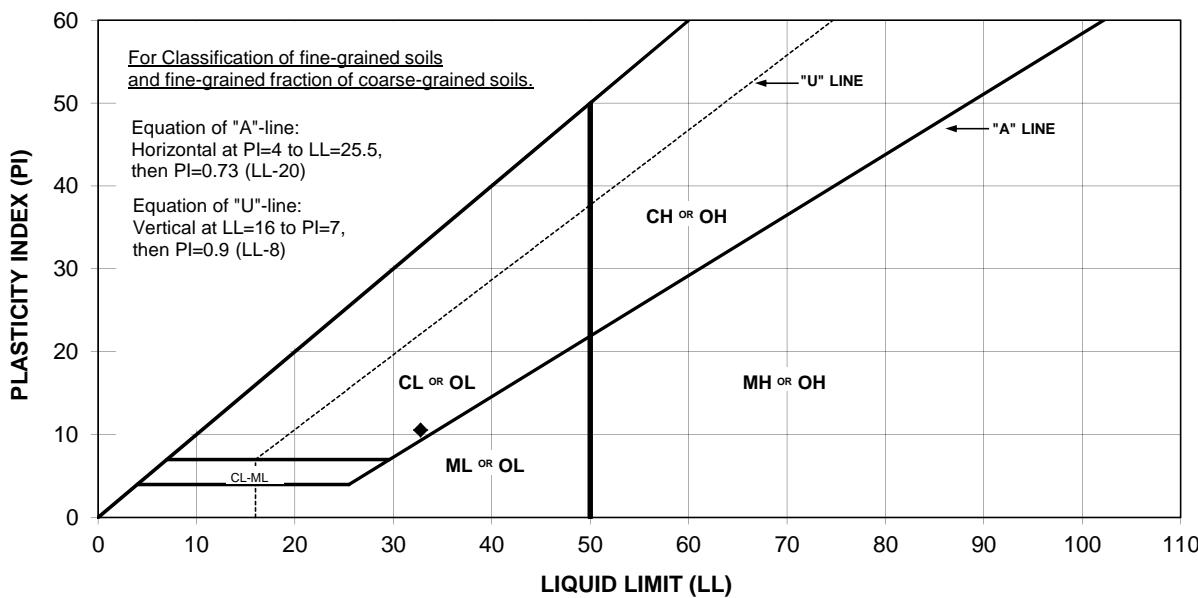
Project Name:	HSR	Project No.:	23502-ZS9
Soil Boring No:	S0069R	Depth:	15.5'-16.0'
Sample No.:	MC04-2	Tested By:	K.Ford
		Classification:	(CL) Sandy Clay

	PLASTIC LIMIT			LIQUID LIMIT			
	1	2	3	No. of Blows	31	21	15
A Tens No.							
B Tare No.							
C Mass of Pan + Dry Soil, g	31.75	30.35	29.93		30.85	32.62	33.96
D Mass of Pan + Wet Soil, g	32.49	30.81	30.38		31.65	33.98	35.78
E Mass of Pan, g	28.35	28.19	28.02		28.31	28.73	28.39
F Mass of Water, g	0.74	0.46	0.45		0.80	1.36	1.82
G Mass of Dry Soil, g	3.40	2.16	1.91		2.54	3.89	5.57
H Moisture Content, %	21.76	21.30	23.56		31.50	34.96	32.68
I Average Moisture Content, % (PL)		22.21					

Liquid Limit:	32.8
Plastic Limit: Line I	22.2
Plasticity Index: PI = LL - PL	10.6



ASTM D2487

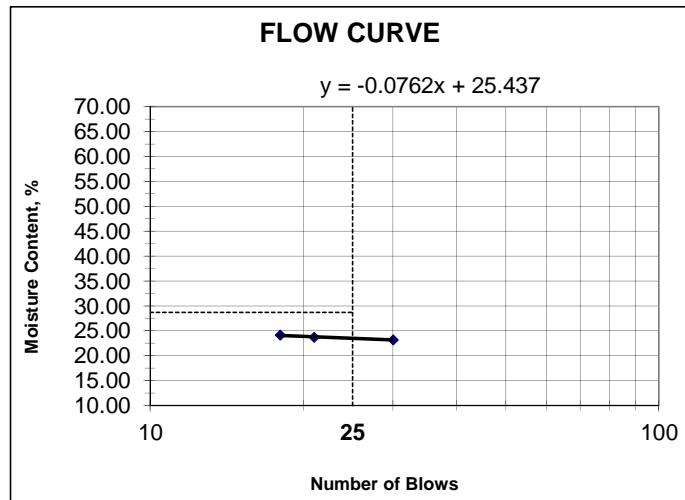


Determination of Atterberg Limits
ASTM D 4318, CTM 204

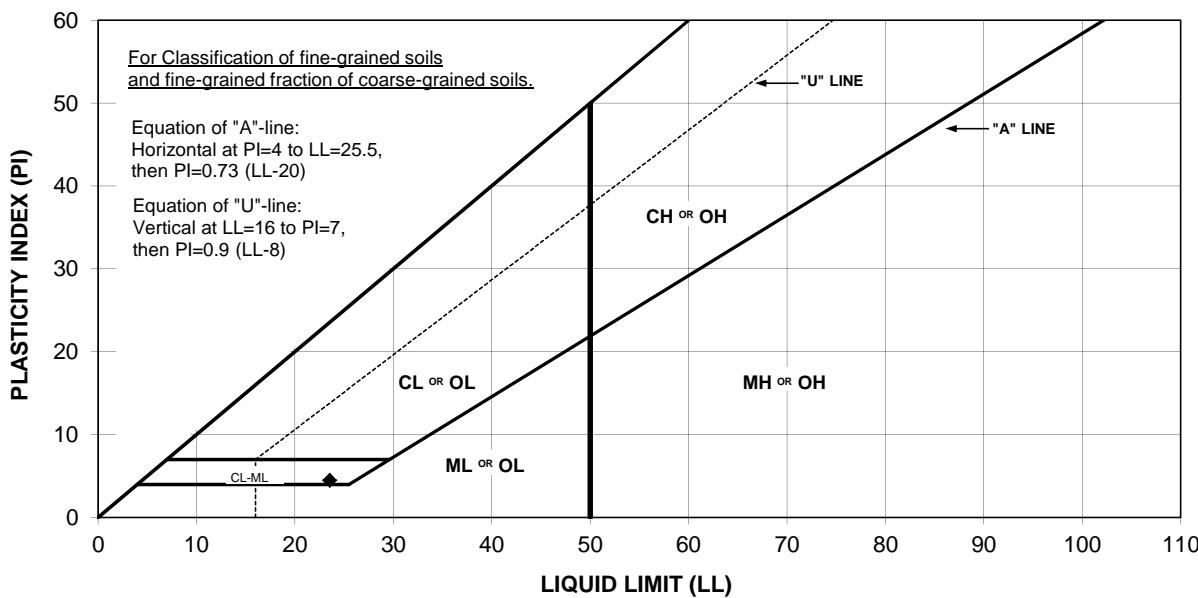
Project Name:	HSR	Project No.:	23502-ZS9	
Soil Boring No:	S0069R	Depth:	24.0'-24.5'	
Sample No.:	U06	Date: 10/18/13 Tested By: K. Ford		
Classification: (CL) Clayey Silt				

	PLASTIC LIMIT			LIQUID LIMIT			
	1	2	3	No. of Blows	18	21	30
A Tens No.							
B Tare No.							
C Mass of Pan + Dry Soil, g	30.72	29.79	30.52		35.29	33.46	35.54
D Mass of Pan + Wet Soil, g	31.18	30.09	30.99		36.98	34.68	37.13
E Mass of Pan, g	28.34	28.21	28.01		28.29	28.32	28.68
F Mass of Water, g	0.46	0.30	0.47		1.69	1.22	1.59
G Mass of Dry Soil, g	2.38	1.58	2.51		7.00	5.14	6.86
H Moisture Content, %	19.33	18.99	18.73		24.14	23.74	23.18
I Average Moisture Content, % (PL)		19.01					

Liquid Limit:	23.5
Plastic Limit: Line I	19.0
Plasticity Index: PI = LL - PL	4.5



ASTM D2487

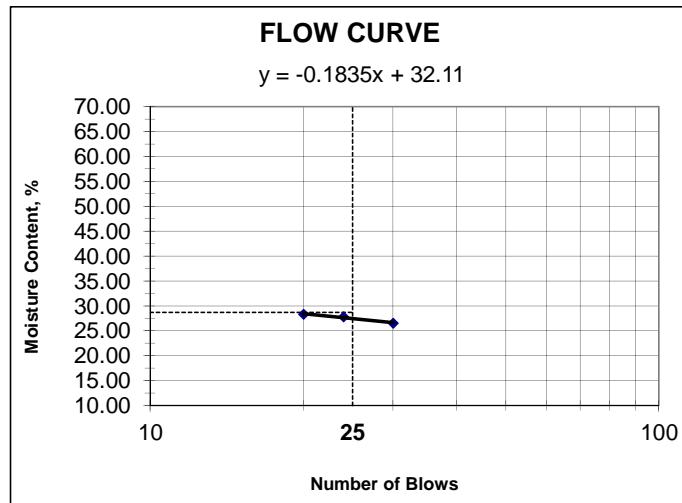


Determination of Atterberg Limits
ASTM D 4318, CTM 204

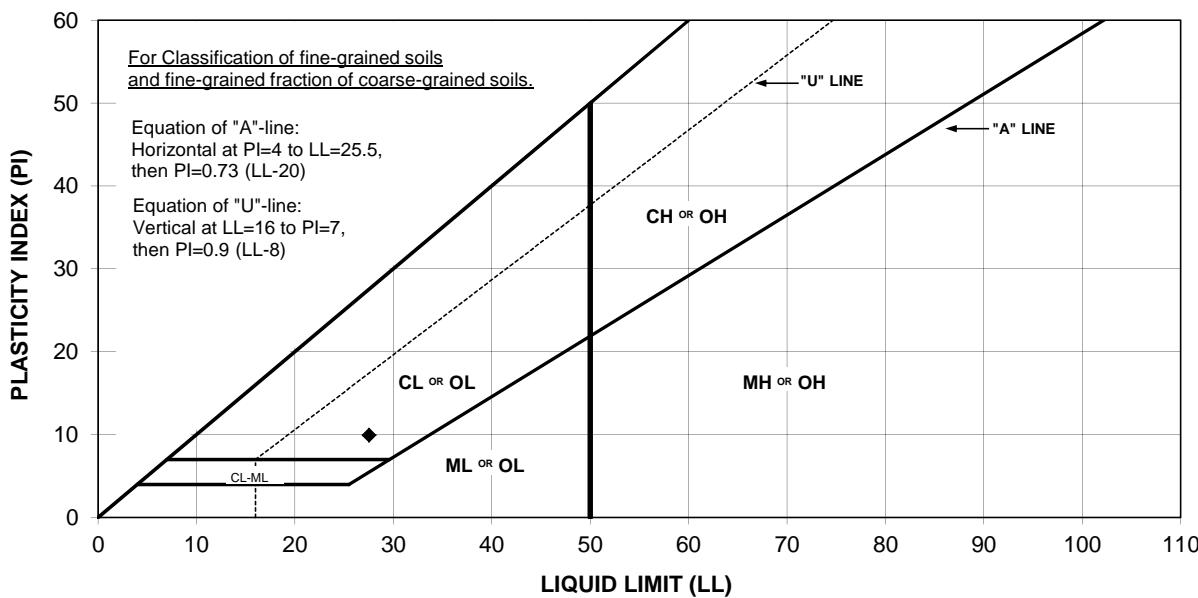
Project Name:	HSR	Project No.:	23502-ZS9
Soil Boring No:	S0069R	Depth:	50.5'-51'
Sample No.:	Date: 10/14/13 Tested By: S. Alvarez		

	PLASTIC LIMIT			LIQUID LIMIT			
	1	2	3	No. of Blows	30	24	20
A Tes No.							
B Tare No.							
C Mass of Pan + Dry Soil, g	31.57	32.63	32.23		31.50	32.09	29.50
D Mass of Pan + Wet Soil, g	32.14	33.35	32.98		34.35	35.25	31.96
E Mass of Pan, g	28.23	28.40	28.20		20.77	20.73	20.83
F Mass of Water, g	0.57	0.72	0.75		2.85	3.16	2.46
G Mass of Dry Soil, g	3.34	4.23	4.03		10.73	11.36	8.67
H Moisture Content, %	17.07	17.02	18.61		26.56	27.82	28.37
I Average Moisture Content, % (PL)		17.57					

Liquid Limit:	27.5
Plastic Limit: Line I	17.6
Plasticity Index: $PI = LL - PL$	10.0



ASTM D2487

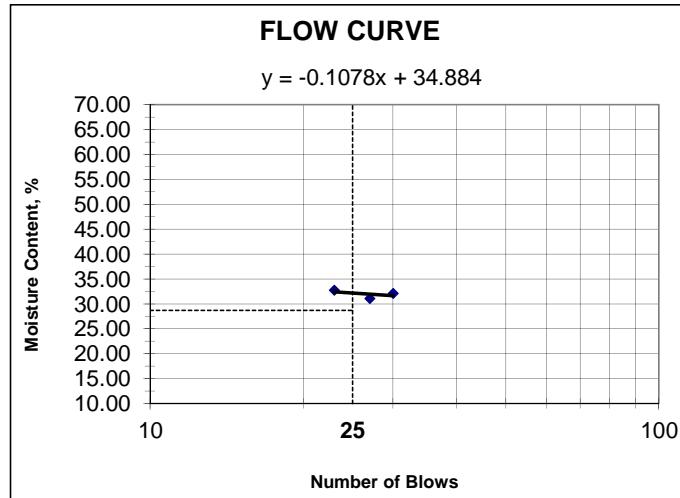


Determination of Atterberg Limits
ASTM D 4318, CTM 204

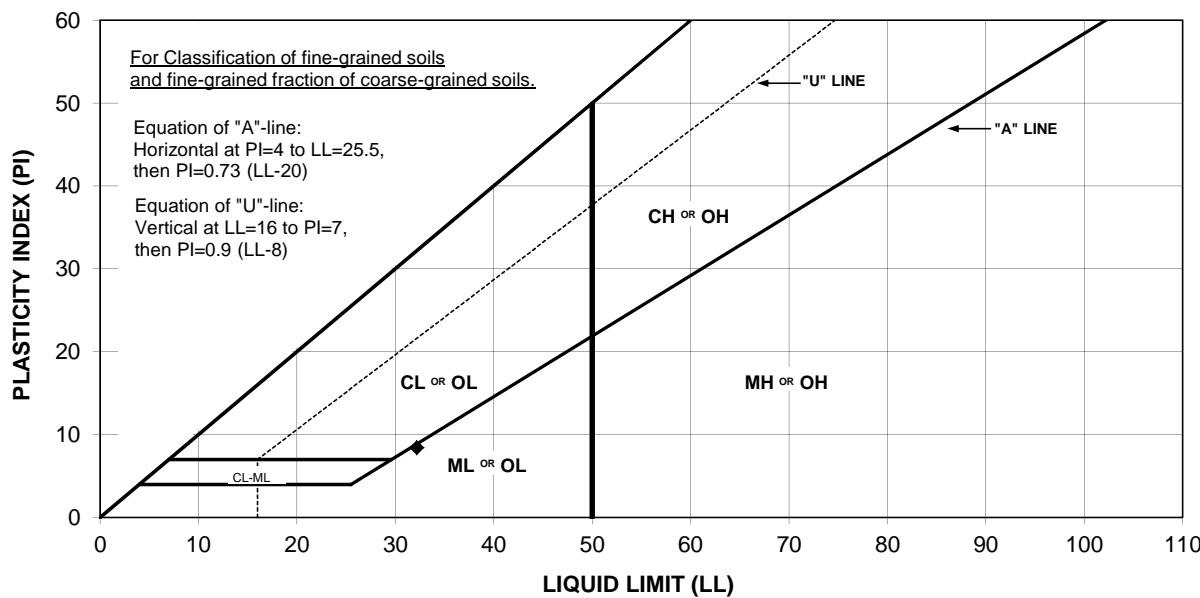
Project Name:	HSR	Project No.:	23502-ZS9	
Soil Boring No:	S0069R	Depth:	56.0'-56.5'	
Sample No.:	SS12	Date: 10/11/13 Tested By: K. Ford		
Classification: (ML) Clayey Silt				

	PLASTIC LIMIT			LIQUID LIMIT			
	1	2	3	No. of Blows	23	27	30
A Tens No.							
B Tare No.							
C Mass of Pan + Dry Soil, g	30.96	29.80	29.16		31.78	36.34	33.58
D Mass of Pan + Wet Soil, g	31.56	30.17	29.45		32.93	38.84	35.18
E Mass of Pan, g	28.32	28.21	28.01		28.27	28.31	28.60
F Mass of Water, g	0.60	0.37	0.29		1.15	2.50	1.60
G Mass of Dry Soil, g	2.64	1.59	1.15		3.51	8.03	4.98
H Moisture Content, %	22.73	23.27	25.22		32.76	31.13	32.13
I Average Moisture Content, % (PL)		23.74					

Liquid Limit:	32.2
Plastic Limit: Line I	23.7
Plasticity Index: PI = LL - PL	8.4



ASTM D2487





Unconsolidated-Undrained Triaxial Compression on Cohesive Soils
ASTM D2850

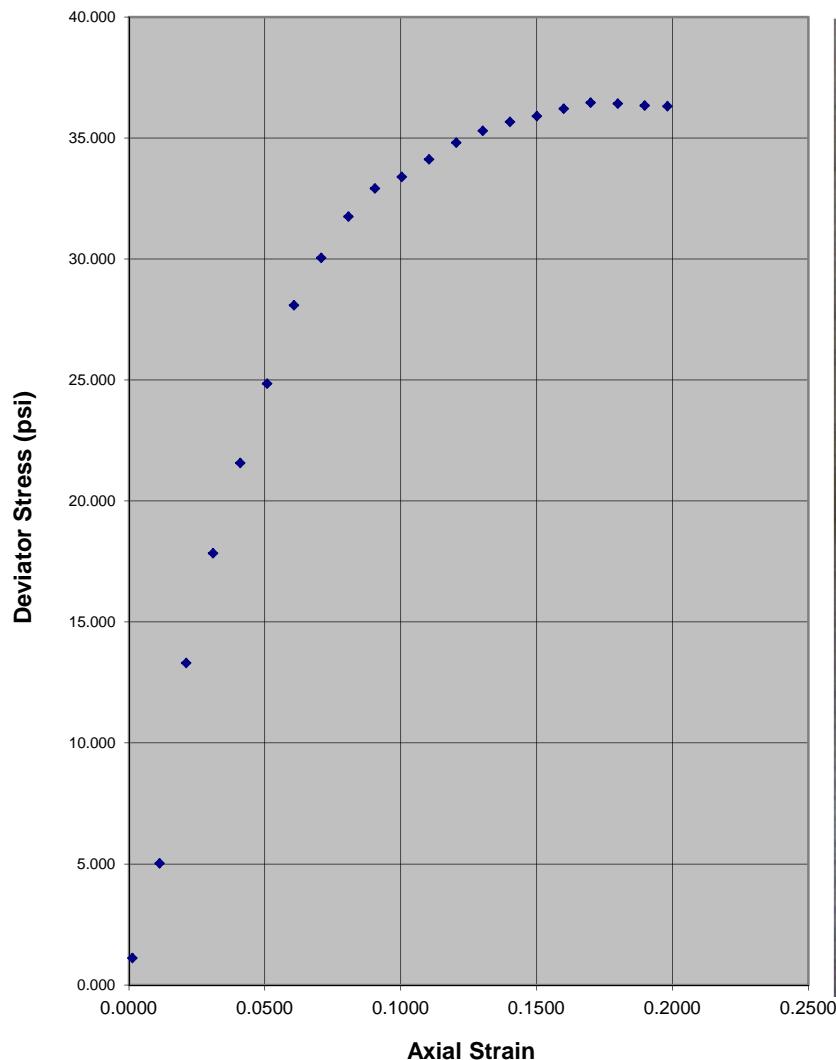
PROJECT CA HST
 BORING # S0069R; MC-2-1 Depth (ft) 6
 DESCRIPTION (CL) Sandy Clay

TES # 23502-ZS9
 Test Date 11/7/2013
 Tested By D. Carruba

Sample and Test Parameters

Wt. Specimen Wet + Tare (gm)	<u>750.7</u>	Water Content %	<u>20.7</u>	Diameter, D_0 , (in)	<u>2.41</u>
Wt. Specimen Dry + Tare (gm)	<u>622.1</u>	Wt. Tare (gm)	<u>0</u>	Area, A_0 , (in^2)	<u>4.56</u>
Wt. Water (gm)	<u>128.6</u>	Unit Wt. Wet (pcf)	<u>123.4</u>	Height, H_0 , (in)	<u>5.08</u>
Wt. Speciment Dry (gm)	<u>622.1</u>	Unit Wt. Dry (pcf)	<u>102.3</u>	Volume, V_0 , (in^3)	<u>23.17</u>
Rate, in/min	<u>0.05</u>	Rate, %/min	<u>1.00</u>	Saturation, %*	<u>86.2</u>
Cell Pressure, psi	<u>10</u>	Strain, %	<u>16.99%</u>	Deviator Stress, psi	<u>36.45</u>

*S.G. assumed 2.70





Unconsolidated-Undrained Triaxial Compression on Cohesive Soils
ASTM D2850

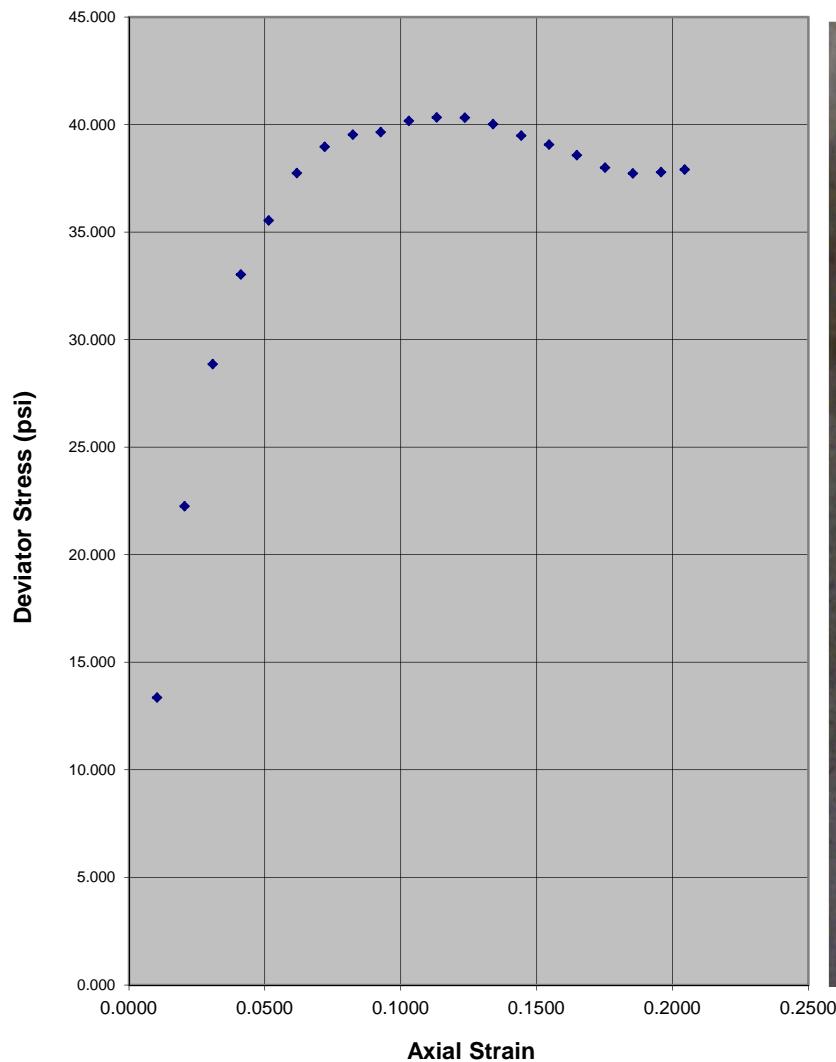
PROJECT CA HST
 BORING # S0069R; MC-4-1 Depth (ft) 16
 DESCRIPTION (CL) Sandy Clay

TES # 23502-ZS9
 Test Date 11/7/2013
 Tested By D. Carruba

Sample and Test Parameters

Wt. Specimen Wet + Tare (gm)	<u>771.9</u>	Water Content %	<u>19.1</u>	Diameter, D_0 , (in)	<u>2.43</u>
Wt. Specimen Dry + Tare (gm)	<u>648.1</u>	Wt. Tare (gm)	<u>0</u>	Area, A_0 , (in^2)	<u>4.64</u>
Wt. Water (gm)	<u>123.8</u>	Unit Wt. Wet (pcf)	<u>129.7</u>	Height, H_0 , (in)	<u>4.89</u>
Wt. Speciment Dry (gm)	<u>648.1</u>	Unit Wt. Dry (pcf)	<u>108.9</u>	Volume, V_0 , (in^3)	<u>22.68</u>
Rate, in/min	<u>0.05</u>	Rate, %/min	<u>1.00</u>	Saturation, %*	<u>94.2</u>
Cell Pressure, psi	<u>20</u>	Strain, %	<u>11.33%</u>	Deviator Stress, psi	<u>40.34</u>

*S.G. assumed 2.70





Unconsolidated-Undrained Triaxial Compression on Cohesive Soils
ASTM D2850

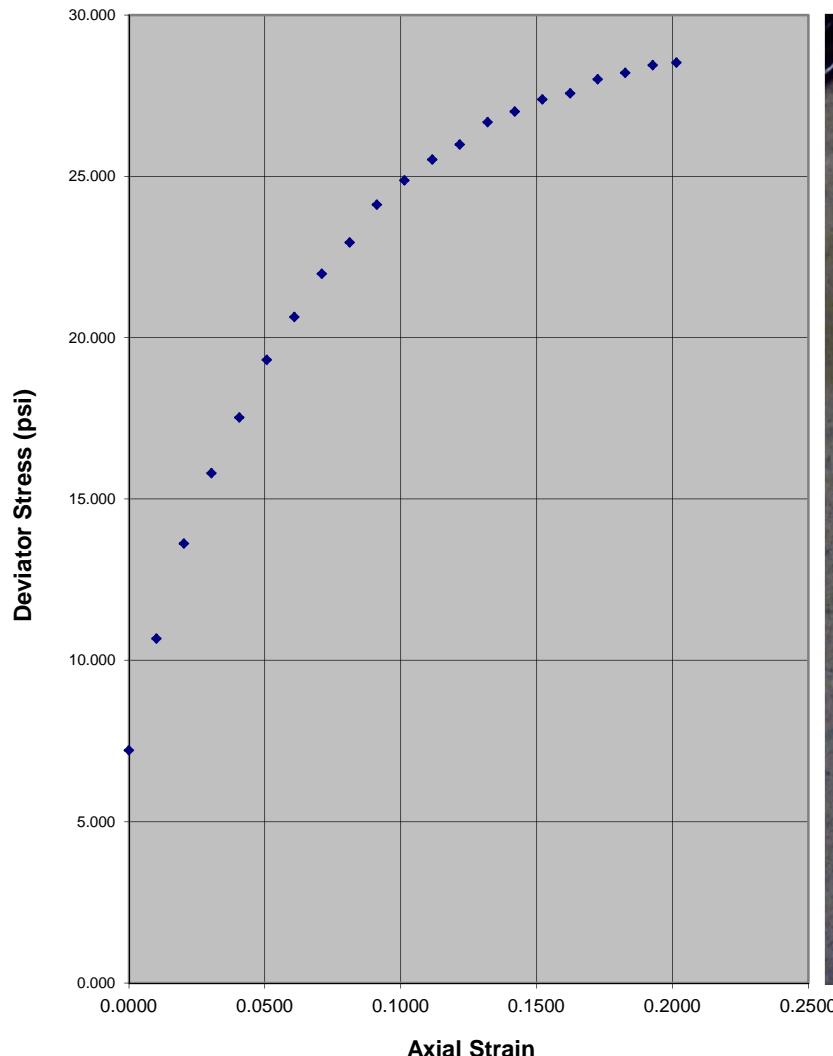
PROJECT CA HST
 BORING # S0069R; MC11-1 Depth (ft) 51
 DESCRIPTION (CL) Sandy Clay

TES # 23502-ZS9
 Test Date 11/7/2013
 Tested By D. Carruba

Sample and Test Parameters

Wt. Specimen Wet + Tare (gm)	<u>790.6</u>	Water Content %	<u>19.4</u>	Diameter, D_0 , (in)	<u>2.42</u>
Wt. Specimen Dry + Tare (gm)	<u>662.0</u>	Wt. Tare (gm)	<u>0</u>	Area, A_0 , (in^2)	<u>4.60</u>
Wt. Water (gm)	<u>128.6</u>	Unit Wt. Wet (pcf)	<u>131.8</u>	Height, H_0 , (in)	<u>4.97</u>
Wt. Speciment Dry (gm)	<u>662</u>	Unit Wt. Dry (pcf)	<u>110.3</u>	Volume, V_0 , (in^3)	<u>22.86</u>
Rate, in/min	<u>0.05</u>	Rate, %/min	<u>1.00</u>	Saturation, %*	<u>99.5</u>
Cell Pressure, psi	<u>55</u>	Strain, %	<u>20.14%</u>	Deviator Stress, psi	<u>28.53</u>

*S.G. assumed 2.70





CONSOLIDATION TEST DATA SUMMARY

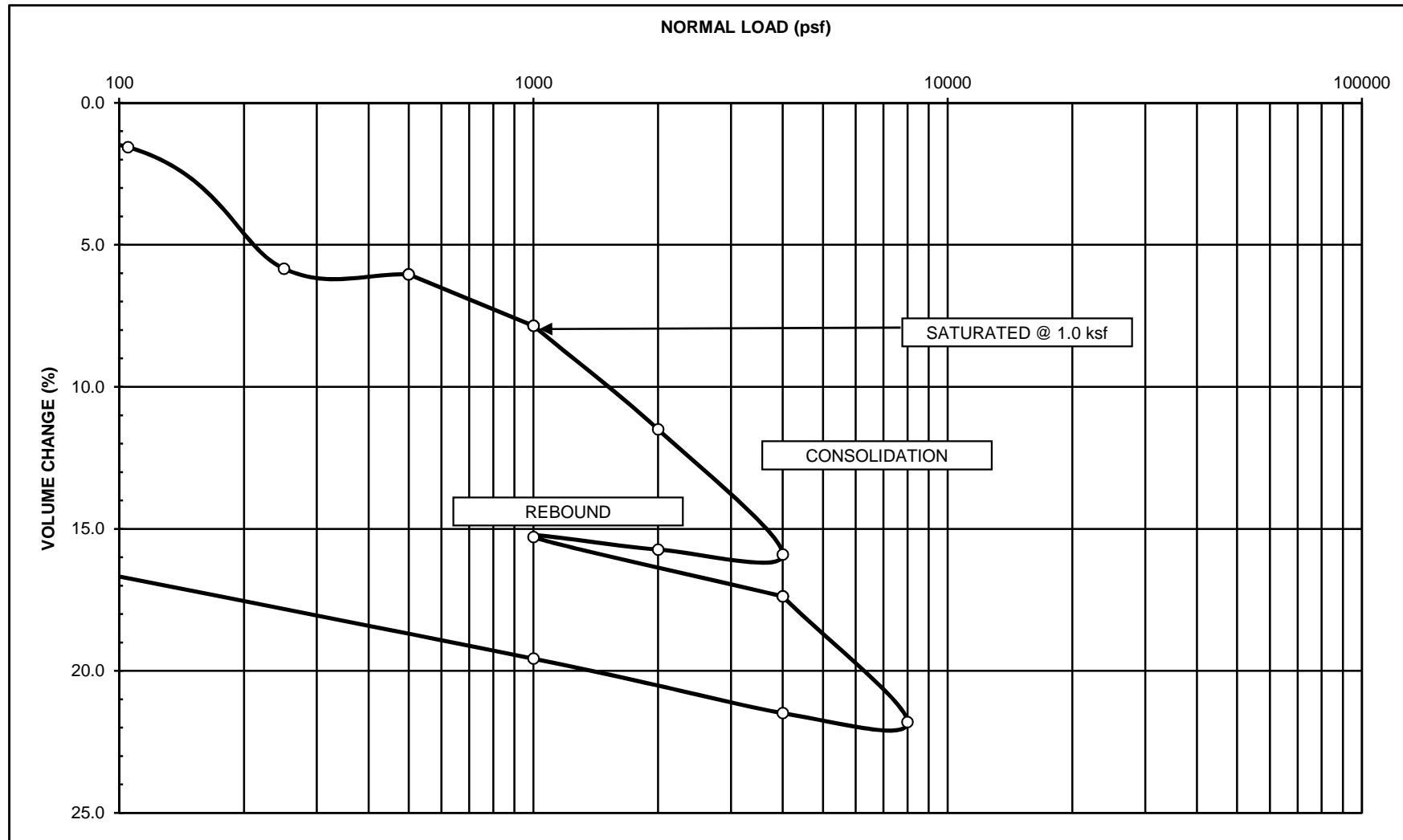
PROJECT:	HSR	BORING #:	S0069R	TES # :	23502-ZS9
BORING #:	U03	DEPTH (ft)	7-7.5'	DATE:	10/11/2013
DESCRIPTION:	CLAY (CL)			TESTED BY:	K.Ford
REMARKS:	Saturated @ 1 ksf.				
DIAMETER (in)	2.43				

	<u>INITIAL</u>	<u>FINAL</u>
THICKNESS (in)	1.0000	0.8471
VOLUME (cc)		
GROSS WET	181.7	175.4
GROSS DRY	144.7	144.7
TARE	42.2	42.2
WATER	37.0	30.7
SOIL	102.5	102.5
MOISTURE CONTENT (%)	36.1	30.0
WET DENSITY (pcf)	115.5	130.2
DRY DENSITY (pcf)	84.9	100.2



Construction Testing & Inspection * Geotechnical & Environmental Engineering

CONSOLIDATION TEST DATA



BORING NO.	DEPTH (ft)	SAMPLE DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PROJECT: HSR
U03	7-7.5'	CLAY (CL) Saturated @ 1 ksf.	36.1 FINAL 30.0	84.9 FINAL 100.2	PROJECT NO.: 23502-ZS9
					TEST DATE: 10/11/2013
					TESTED BY: K.Ford
					CONDITION: Undisturbed

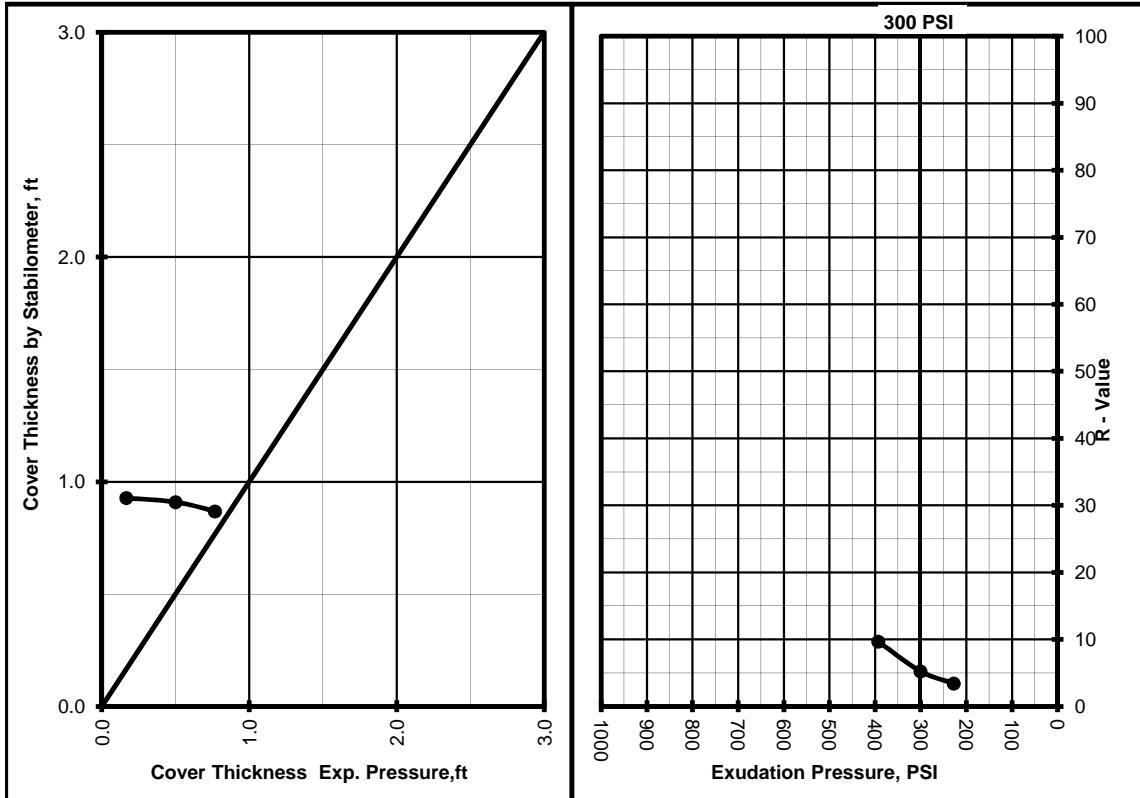


TECHNICON
ENGINEERING SERVICES, INC.
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number : 23502-ZS9
 Project Name : CA HSR FRE_BAK
 Date : 10/26/13
 Sample Location/Curve Number : Boring S0069R,B-1 @ 0-5'
 Soil Classification : SC

TEST	A	B	C
Percent Moisture @ Compaction, %	14.6	15.8	16.9
Dry Density, lbm/cu.ft.	115.7	112.8	110.5
Exudation Pressure, psi	393	300	227
Expansion Pressure, (Dial Reading)	0.0023	0.0015	0.0005
Expansion Pressure, psf	0.009959	0.006495	0.002165
Resistance Value R	10	5	3

R Value at 300 PSI Exudation Pressure	5
R Value by Expansion Pressure (TI =):	6



TECHNICON
ENGINEERING SERVICES, INC.



Laboratory Compaction Curve

ASTM D - 1557

Project Number : 23502-ZS9
 Project Name : CA HSR FRE_BAK
 Date : 10/15/2013
 Sample location : S0069R
 Sample/Curve Number : B01 0-5'
 Soil Classification : (SC) Sandy Clay
 Test Method : 1557C

	1	2	3	4
Weight of Moist Specimen & Mold, gm	7553.5	7561.1	7450.7	
Weight of Compaction Mold, gm	2857.1	2857.1	2857.1	
Weight of Moist Specimen, gm	4696.4	4704.0	4593.6	
Volume of mold, cu. ft.	0.0750	0.0750	0.0750	
Wet Density, lbs/cu.ft.	138.0	138.3	135.0	
Weight of Wet (Moisture) Sample, gm	200.0	200.0	200.0	
Weight of Dry (Moisture) Sample, gm	182.4	179.9	185.1	
Moisture Content, %	9.6	11.2	8.0	
Dry Density, lbs/cu.ft.	125.9	124.4	125.0	

